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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/812,276	03/20/2001	Michio Horiuchi	072-01	2361

7590 09/23/2003

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EXAMINER

OWENS, DOUGLAS W

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 09/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/812,276

Applicant(s)

HORIUCHI ET AL.

Examiner

Douglas W Owens

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 20-22,27 and 39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20-22,27 and 39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 20 – 22 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over US patent No. 5,892,271 to Takeda et al. in view of US patent No. 5,999,413 to Ohuchi et al.

Regarding claims 20 and 39, Takeda et al. teaches a semiconductor device, comprising:

a resin member of a predetermined thickness (19), said resin member being made of a seal resin (Col. 7, lines 9 – 13);

a semiconductor element (1) having an active surface facing downward;

metal interconnections (in via (14), see Col. 6, line 65 – Col. 7, line 2) formed directly on the bottom surface of the resin member; and

connection terminals (2, 3) extending downward from the active surface of the semiconductor element and having bottom ends connected to top surfaces of said metal interconnections (See for example, the connections in Fig. 8).

Takeda et al. further teaches a resin coating over the bottom side of the semiconductor element to seal the electrode surface of the element inside the coating

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(Col. 7, lines 9-13) so that the back surface of the chip is exposed. Takeda et al. does not teach resin on the sides of the chip, such that the chip is enclosed.

Ohuchi et al. teaches a semiconductor device wherein the semiconductor element (21) is sealed inside the resin member (26) and wherein the element has a back surface exposed at a top surface of the resin member (Fig. 4, for example), the surface of the resin and semiconductor element being in the same plane. It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Ohuchi et al. into the device taught by Takeda et al. since it is desirable to protect the chip from the detrimental effects of the environment, such as moisture and debris.

Regarding claim 21, the combined teaching of Takeda et al. and Ohuchi et al. disclose a device wherein the back surface of the semiconductor element and the top surface of the resin member form the same plane.

Regarding claim 22, the proposed device of Takeda et al. and Ohuchi et al. discloses a semiconductor device, as recited above, further disclosing wherein the device is provided with a solder resist layer covering the entire bottom surface of said resin member including said metal interconnections, passing through said solder resist layer, and projecting downward (see, for example, Takeda et al., Fig. 8 (15) and Col. 7, lines 13-17).

3. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takeda et al. and Ohuchi et al. as applied to claim 20 above, and further in view of US patent No. 6,023,096 to Hotta et al.

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Neither Takeda et al. nor Tomikawa et al. teach a device, wherein an inorganic filler is dispersed in the resin member. Hotta et al. teaches a semiconductor device, wherein an inorganic filler is dispersed in the resin member (Col. 5, lines 54-65). It would have been obvious to one of ordinary skill in the art to incorporate the teaching of Hotta et al. into the device taught by Takeda et al. and Ohuchi et al. since it is desirable to protect the chip from the effects of differential thermal expansion.

Response to Arguments

4. Applicant's arguments filed July 11, 2003 have been fully considered but they are not persuasive.

The Applicant argues that Takeda et al. does not teach metal interconnections formed directly on the bottom surface of the resin member. This feature is shown in Fig. 7, wherein the metal interconnection (See Col. 6, line 65 – Col. 7, line 2) in the through hole (14) directly contacts the bottom surface of the resin member (19).

5. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas W Owens whose telephone number is 703-308-6167. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

DWO



TOM THOMAS
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